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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/566,412

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Jurgen Ruhe

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THE WEBB LAW FIRM, P.C.
700 KOPPERS BUILDING
436 SEVENTH AVENUE
PITTSBURGH, PA 15219

EXAMINER

EOM, ROBERT J

ART UNIT

PAPER NUMBER

1797

MAIL DATE

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12/16/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/566,412	Applicant(s) RUHE ET AL.	
	Examiner ROBERT EOM	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>02/23/2007</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

1. Claims 1-6 and 9 are objected to because of the following informalities:

Regarding claim 4, *[sic]* is in line 3 and should be either corrected or removed.

Regarding claims 1-6 and 9, there are multiple reference numbers which are not parenthesized. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 8, 9, and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 recites the limitation "the polymer" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 9 recites the limitation "the polymer" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 11 recites the limitation "the depressions" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-3 and 10-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Burgmair et al. (Contribution of the gate insulator surface to work function measurements with a gas sensitive FET).

Regarding claim 1, Burgmair discloses a gas sensor comprising a substrate of a first charge carrier type (Figure 2, see: base layer (not labeled)), whereon a drain (Figure 2, see: drain) and a source (Figure 2, see: source) of a second charge carrier type are arranged, wherein a channel area is formed between the drain and the source (Figure 2, see: channel) and with a gas-sensitive layer comprising poles between which a gas-induced voltage is produced according to the concentration of a gas which is in contact with the layer (Figure 2, see: gas sensitive film), wherein in order to measure the voltage, the gas-sensitive layer is capacitatively coupled by one of its poles to the channel area over an air gap (Figure 2, see: air gap) and by its other pole to a counter-electrode having a reference potential (Figure 2, see: suspended silicon gate), characterized in that a hydrophobic layer is arranged on the surface of the gas sensor between the gas sensitive layer and the channel area and/or a sensor electrode, which is electrically connected to a gate electrode arranged on the channel area (Figure 2, see: gate insulator).

Regarding claim 2, Burgmair et al. discloses all of the claim limitations as set forth above. Burgmair et al. further discloses an electrically conductive guard ring on its surface, which delimits the channel area and/or the sensor electrode leading to the channel area from the channel area and/or the sensor electrode by means of a space (Figure 2, see: guard ring), and further characterized in that the hydrophobic layer is arranged in at least one area of the surface of the gas sensor located between the guard ring and the channel area and/or the sensor electrode (Figure 2, see: gate insulator).

Regarding claim 3, Burgmair et al. discloses all of the claim limitations as set forth above. Burgmair et al. further discloses the hydrophobic layer extends continuously over the channel area and/or the sensor electrode (Figure 2, see: gate insulator).

Regarding claim 10, Burgmair et al. discloses all of the claim limitations as set forth above. Burgmair et al. further discloses the hydrophobic layer has a surface profiling with projections and depressions (Figure 2, see: channel created in the gate insulator).

Regarding claim 11, Burgmair et al. discloses all of the claim limitations as set forth above. Burgmair et al. further discloses the depressions are in the form of slots or grooves and preferably form a frame or a ring around the channel area and/or the sensor electrode (Figure 2, see: channel created in the gate insulator).

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Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burgmair et al. (Contribution of the gate insulator surface to work function measurements with a

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gas sensitive FET), as applied to claim 1 above, in view of Ruther et al. (Surface conductivity of a CMOS silicon nitride layer).

Regarding claim 4, Burgmair et al. discloses all of the claim limitations as set forth above.

Burgmair et al. does not explicitly disclose the hydrophobic layer is separated from the channel area and/or the sensor electrode and delimits the channel area and/or the sensor electrode preferably in a ring or frame like manner.

Ruther et al teaches a capacitive gas sensor based on suspended gate field effect transistors (Figure 1), with a hydrophobic layer that is separated from the exposed electrode and delimits the exposed electrode in a frame like manner (Figure 1, see: silicon nitride passivation layer which frames the exposed electrode).

Burgmair et al. and Ruther et al. are analogous because both references are directed to capacitive gas sensors based on suspended field effect transistors.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to separate the sensor electrode in the gas sensor of Burgmair et al., as taught by Ruther et al., since doing so enhances signal response when the sampled gas is at a higher relative humidity (Ruther et al., see: Figure 10).

11. Claims 5, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burgmair et al. (Contribution of the gate insulator surface to work function measurements with a gas sensitive FET), as applied to claim 1 above, in view of Usui et

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al. (Ionization-assisted deposition of alkyacrylate and Fluorinated alkylacrylate polymer thin films).

Regarding claim 5, 7, and 8, Burgmair et al. discloses all of the claim limitations as set forth above.

Burgmair et al. does not explicitly disclose the static contact angle of the hydrophobic layer measured with water and obtained on a planar surface is at least 70°, if necessary at least 90°, especially at least 105° and preferably at least 120°. Additionally, Burgmair et al. does not explicitly disclose the hydrophobic layer contains at least one polymer, preferably a perfluoride polymer.

Usui et al. teaches a method of depositing fluorinated polymer thin films (p106/C1, see: 20FAC Films) onto substrates using ionization-assisted deposition producing 20FAC thin films with a contact angle of about 94° (p107/Fig. 9).

Burgmair et al. and Usui et al. are analogous because both references are directed towards semiconducting substrates with hydrophobic films.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the hydrophobic Si₃N₄ layer of Burgmair et al. with the hydrophobic 20FAC layer of Usui et al., since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

12. Claims 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burgmair et al. (Contribution of the gate insulator surface to work function

measurements with a gas sensitive FET), as applied to claim 1 above, in view of Usui et al. (Ionization-assisted deposition of alkyacrylate and Fluorinated alkyacrylate polymer thin films), as applied to claims 5, 7, and 8 above, further in view of Yang et al. (USP 6,670,286 B1).

Regarding claims 6 and 9, modified Burgmair et al. discloses all of the claim limitations as set forth above.

Modified Burgmair et al. does not explicitly disclose that the molecules of the hydrophobic layer are covalently bound to the surface of an adjacent, preferably semi-conductive or electrically insulating layer of the gas sensor. Additionally, modified Burgmair et al. discloses in that the polymer is connected by an intermediate layer that is preferably in the form of a monolayer to an adjacent, preferably semi-conductive or electrically insulating layer of the gas sensor, and further characterized in that the intermediate layer has at least one reactive group anchored on the adjacent layer, and that the polymer is coupled preferably by means of a covalent bond to the intermediate layer.

Yang et al. teaches a photopolymerization-based method for the fabrication of chemical sensing films that covalently binds a polymer film (C7?113-14) onto a intermediate layer (Fig. 1A, see: functionalization layer) which has been covalently bound to a electrically insulating layer (Fig. 1A, see: oxide base; C8/L51-52).

Modified Burgmair et al. and Yang et al. are analogous because both references are directed towards semiconductor based electrochemical sensors.

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It would have been obvious to one having ordinary skill in the art at the time of the invention to use a photopolymerization fabrication method in the chemical sensor of modified Burgmair et al, as taught by Yang et al., since doing so allows the patterning of multiple regions of a selected film (Abstract).

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT EOM whose telephone number is (571)270-7075. The examiner can normally be reached on Mon.-Thur., 9:00am-5:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571)272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tony G Soohoo/
Primary Examiner, Art Unit 1797

/R. E./
Examiner, Art Unit 1797